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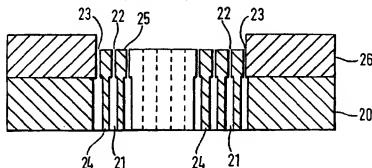
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(54) Composite fat based confectionery and process for making the same

(57) A structured chocolate or fat-containing confectionery material and a process for its production a which comprises feeding a chocolate or a fat-containing confectionery material into an extrusion device and applying pressure to the chocolate or fat-containing confectionery material upstream of a flow constriction provided with a plurality of forming pins to extrude the

chocolate or fat-containing confectionery material in the form of a continuous mass having substantially longitudinal passages characterised in that the chocolate or fat-containing confectionery material is extruded in a solid or semi-solid non-pourable or non-flowable state.

FIG. 1



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## Description

The present invention relates to a process for preparing structured chocolate or fat-containing confectionery material as well as to a confectionery or food product comprising a structured chocolate or fat-containing confectionery material, as one component, contained or dispersed within or partially within a continuous phase of a further chocolate or fat-containing confectionery material or food material.

In this invention, "structured" chocolate or fat-containing confectionery material should be understood to refer to a chocolate or fat-containing confectionery material having a continuous structure determined by an extrusion die, with a plurality of continuous longitudinal spaces or passages, which may be cellular or honeycombed in arrangement, and is distinguished from "aerated" chocolate which has randomly spaced air pockets rather than continuous air spaces or passages. The bite-characteristics, mouth-feel and texture of structured chocolate is different to that of aerated chocolate.

The air pockets in normal aerated chocolate are formed by the use of super- or sub-atmospheric pressure and the production process requires expensive, complex machinery using gas under pressure, e.g. CO<sub>2</sub>, or vacuum-chamber equipment. In contrast, hollow chocolate products containing one or more passages may be prepared by extrusion of molten or pumpable chocolate as described in WO 95/26640 and GB-A-2186836. We have found surprisingly that structured chocolate or fat-containing confectionery material in this invention in the form of a continuous mass having longitudinal passages may be obtained easily and cheaply by extrusion of a chocolate or fat-containing confectionery material in a solid state by an extrusion method such as that described in EP-A-0603467 whose contents are incorporated in the present specification, or by extrusion through dies typically used for producing pasta shapes, other extrudable food products, rubber or ceramics as known in the art. In order to obtain the longitudinal passages in the extrudate, two or more solid longitudinal partitions or forming pins (both of which are hereinafter referred to as forming pins) are fixed in the flow constriction.

According to the present invention there is provided a process for producing a structured chocolate or fat-containing confectionery material which comprises feeding a chocolate or a fat-containing confectionery material into an extrusion device and applying pressure to the chocolate or fat-containing confectionery material upstream of a flow constriction provided with a plurality of forming pins to extrude the chocolate or fat-containing confectionery material in the form of a continuous mass having substantially longitudinal passages characterised in that the chocolate or fat-containing confectionery material is extruded in a solid or semi-solid non-pourable or non-flowable state.

For example, the flow constriction may include a die having an inlet zone comprising a plurality of discrete

channels extending from the rear of the die in the direction of the face of the die to an outlet zone having an outlet profile conforming to the desired shape of the structured chocolate or a fat-containing confectionery material, the aggregate cross-sectional area of the outlet profile being sufficiently less than that of the discrete channels in the inlet zone and whereby material entering the inlet channels coalesces inside the die to emerge from the outlet profile communicating with the discrete channels. The outlet profile may have the configuration of a series of parallel slots intersecting at right angles such as are described in GB-A-1385907 which describes a die suitable for extruding materials for making refractory catalyst supports in the form of blocks of ceramic having parallel through passages.

The extrusion is preferably carried out by applying pressure to the chocolate or fat-containing confectionery material in a solid or semi-solid non-pourable form whereby the temperature, pressure, contraction ratio and extrusion rate are such that it remains in a solid or semi-solid non-pourable form during extrusion and which has a temporary flexibility or plasticity after extrusion, e.g. as described in our co-pending EP-A-0603467. The temporary flexibility or plasticity may last for up to four hours or more, e.g. from 1 minute to 2 hours, and more usually from 5 minutes to 2 hours.

The longitudinal passage or passages of the structured chocolate or fat-containing confectionery material may contain air but, if desired, they may be filled with one or more materials such as liquid, semi-solid or solid confectionery materials which may, if desired, differ visually or texturally from the structured chocolate or fat-containing confectionery material, but may in fact be chocolate. Examples of such other materials present in the longitudinal passage or passages of the structured chocolate or fat-containing confectionery material include praline, truffle, mousse, fondant, caramel, flavours, colours or any combination thereof.

The present invention also provides a composite confectionery or food product comprising a structured chocolate or fat-containing confectionery material prepared in accordance with the process of the present invention in combination with at least one further confectionery or food material.

The present invention further provides a composite confectionery or food product comprising a structured chocolate or fat-containing confectionery material as one component, contained or dispersed within or partially within a continuous phase of a further chocolate or fat-containing confectionery material or food material.

The composite confectionery or food product of the present invention may be prepared, for example, by co-extrusion of the further confectionery material simultaneously with the extrusion of the chocolate or fat-containing confectionery material. Alternatively, extrusion of one material may be carried out consecutively after manufacture of the other material and assembled manually or automatically to give the composite product.

The structured chocolate may be, for instance,

plain, white or milk chocolate.

Structured fat containing confectionery materials may include sugar, milk derived components, and fat and solids from vegetable or cocoa sources in differing proportions having a moisture content less than 10%, more usually less than 5% by weight. They may be chocolate substitutes containing direct cocoa butter replacements, stearines, coconut oil, palm oil, butter or any mixture thereof; nut pastes such as peanut butter and fat; praline; confectioner's coatings used for covering cakes usually comprising chocolate analogues with cocoa butter replaced by a cheaper non-tempering fat; or "Caramac" (RTM) sold by Nestlé comprising non-cocoa butter fats, sugar and milk.

The further confectionery or other food material present in the composite product of the present invention may be, for instance, ice cream, mousse, praline, fondant, marshmallow, wafer, biscuit or a chocolate or fat-containing confectionery material such as cake or pastry which may, if desired, differ visually or texturally from the structured chocolate or fat-containing confectionery material. For example, if the structured chocolate or fat-containing confectionery material is made of a dark chocolate, the further confectionery material may be white chocolate. The structured chocolate or fat-containing confectionery material and the further confectionery material may be arranged in any physical combination, e.g. they may be arranged in layers or either one may be encased by the other. There may be more than one layer of structured chocolate or fat-containing confectionery material and there may be more than one layer of one or more further confectionery or food materials. In addition, in the composite product the substantially longitudinal passages of the structured chocolate or fat-containing confectionery material may be filled with one or more materials such as liquids, semi-solid, or solid confectionery materials. It will be appreciated that the cross-sectional area of the air passages will normally need to be larger for filling with more viscous liquids and solid or semi-solid confectionery materials than for filling with lower viscosity liquids.

The use of structured chocolate according to the present invention in contrast to normal aerated chocolate in which the air pockets are formed randomly and are not of the same size gives advantages examples of which are as follows:

a) the substantially longitudinal passages of the structured chocolate or fat-containing confectionery material may be filled with one or more materials whereas the air pockets of normal aerated chocolate cannot be filled with other materials.

b) the shape and visual appearance can be very easily controlled exactly as desired; by appropriate die design. For instance, the cross-sectional shape, size and number of the air passages may be controlled by the appropriate form of the die, e.g. the number, size and shape of the forming pins. In par-

ticular, the cross-sectional area of the air passages can be controlled so that they all have the same size which is not possible for the air pockets of normal aerated chocolate. It is possible to have a cross-sectional width of up to 10mm or 40mm or even more. In fact, any width is possible with appropriate die design and a suitable extruder. For example, the cross-sectional width of the air passages may be from 2 to 5mm but could be larger for a small number of single channels filled with ice cream. It is also possible to have extremely thin or thick channels or walls, e.g. from 0.2 to 20mm or more. The air pockets in normal aerated chocolate have a distribution of size and wall thickness, and are essentially randomly positioned. It should be understood that the air passages of structured chocolate may also be formed with different sizes but in a controlled manner rather than essentially randomly as with normal aerated chocolate.

The present invention will now be further illustrated by way of example only with reference to the accompanying drawings in which

Figure 1 is a sectional elevation of a die for use in the present invention together with the outer slot,

Figure 2 is a plan view of the die of Figure 1 with a cut-away partial view of the outer slot,

Figure 3 is a perspective view of a composite product of the present invention comprising a structured milk chocolate tube containing ice cream,

Figure 4 is a perspective view of a composite product of the present invention comprising an extruded white chocolate tube encasing extruded structured milk chocolate,

Figure 5 is a perspective view of a composite product of the present invention comprising structured chocolate encased by ice cream, and

Figure 6 is a perspective view of a composite product of the present invention comprising structured chocolate filled with three filled passages.

Referring to Figures 1 and 2 of the drawings, a die 20 is formed with a series of circular section discrete channels 21, inner slots 22 and outer slots 23. The channels 21 are bounded by partitions 24 and the slots 22 are bounded by separator blocks 25. The outer slots 23 are bounded by a block 26. The slots in the drawings

are linear and positioned along mutually parallel perpendicular lines in the die. The total cross-sectional area of the discrete channels 21 is greater than that of the slots 22 and 23 in order to ensure that sufficient chocolate is supplied to fill the slots.

The slots can be linear or arcuate in cross-section. They may be perpendicular or at an angle. When linear, they may be parallel or diagonal to the sides of the separator blocks 25. The outer slots 23 may be square, circular or elliptical in shape to provide a continuous mass with an outer square, circular or elliptical shape.

In operation, the solid plain chocolate at 25°C is extruded at 50 bars through the die 20 and travels through the discrete channels 21 and through the slots 22, 23 to emerge as continuous profile of structured chocolate having longitudinal passages filled with air.

A composite product consisting of structured plain chocolate enrobed by praline is prepared by co-extruding solid chocolate and praline through an extruder comprising a die as shown in Figures 1 and 2 of the drawings through which the solid chocolate is extruded surrounded by an annular channel through which the praline is extruded.

Figure 3 illustrates a product comprising a milk chocolate tube 27 containing ice cream 28 which is manufactured separately and the two products assembled together.

Figure 4 illustrates a product comprising an extruded white chocolate tube 29 encasing extruded structured milk chocolate 30 extruded using a die based on the die shown in Figures 1 and 2.

Figure 5 illustrates a product comprising structured chocolate 31 extruded using the die shown in Figures 1 and 2 encased by ice cream 32.

Figure 6 illustrates a product comprising structured milk chocolate 33 extruded according to the present invention with three passages filled with other confectionery fillings, praline, truffle and mousse 34.

## Claims

1. A process for producing a structured chocolate or fat-containing confectionery material which comprises feeding a chocolate or a fat-containing confectionery material into an extrusion device and applying pressure to the chocolate or fat-containing confectionery material upstream of a flow constriction provided with a plurality of forming pins to extrude the chocolate or fat-containing confectionery material in the form of a continuous mass having substantially longitudinal passages characterised in that the chocolate or fat-containing confectionery material is extruded in a solid or semi-solid non-pourable or non-flowable state.
2. A process according to claim 1 wherein the flow constriction includes a die having an inlet zone comprising a plurality of discrete channels extending from the rear of the die in the direction of the

face of the die to an outlet zone having an outlet profile conforming to the desired shape of the structured chocolate or a fat-containing confectionery material, the aggregate cross-sectional area of the outlet profile being sufficiently less than that of the discrete channels in the inlet zone and whereby material entering the inlet channels coalesces inside the die to emerge from the outlet profile communicating with the discrete channels.

3. A process according to claim 1 wherein the chocolate or fat-containing confectionery material is extruded in a solid or semi-solid non-pourable form whereby the temperature, pressure, contraction ratio and extrusion rate are such that it remains in a solid or semi-solid non-pourable form during extrusion and which has a temporary flexibility or plasticity after extrusion.
4. A composite confectionery or food product comprising a structured chocolate or fat-containing confectionery material prepared in accordance with the process of claim 1 in combination with at least one further confectionery or food material.
5. A composite confectionery or food product comprising a structured chocolate or fat-containing confectionery material as one component, contained or dispersed within or partially within a continuous phase of a further chocolate or fat-containing confectionery material or food material.
6. A composite confectionery or food product according to claim 4 or claim 5 wherein the longitudinal passages of the structured chocolate or fat-containing confectionery material are filled with one or more liquid, solid or semi-solid confectionery or other food materials.
7. A composite confectionery or food product according to claim 4 or claim 5 wherein the further confectionery or food material differs visually or texturally from the structured chocolate or fat-containing confectionery material.
8. A composite confectionery or food product according to claim 4 or claim 5 wherein the further confectionery or other food material is ice cream, mousse, praline, fondant, marshmallow or a chocolate or fat-containing confectionery material.
9. A composite confectionery or food product according to claim 4 wherein the structured chocolate and the other material are arranged in layers or one may be encased by the other.
10. A structured chocolate or fat-containing confectionery material obtainable by a process according to any of claims 1 to 3.

FIG. 1

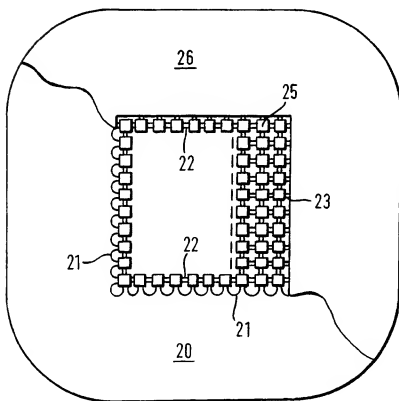
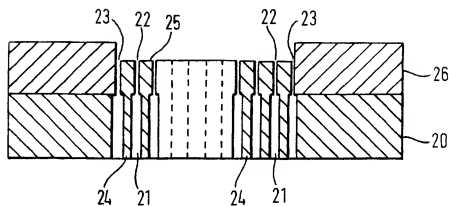
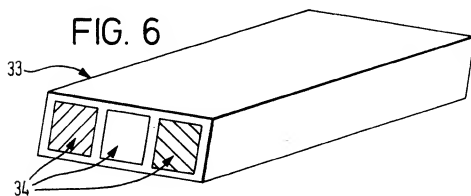
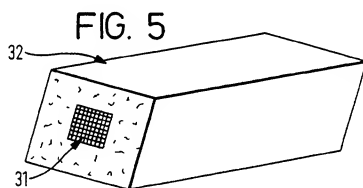
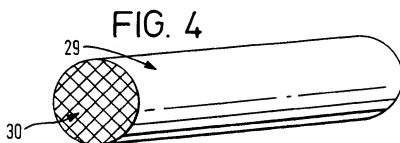
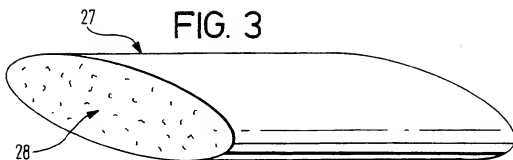


FIG. 2



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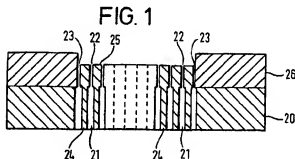
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(57) A structured chocolate or fat-containing confectionery material and a process for its production which comprises feeding a chocolate or a fat-containing confectionery material into an extrusion die (20) and applying pressure to the chocolate or fat-containing confectionery material upstream of a flow constriction provided with a plurality of forming pins to extrude the chocolate or fat-containing confectionery material in the form of a continuous mass having substantially longitudinal passages characterised in that the chocolate or fat-containing confectionery material is extruded in a solid or semi-solid non-pourable or non-flowable state.



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## EUROPEAN SEARCH REPORT

Application Number  
EP 96 20 2835

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	US 4 932 317 A (HOORMANN WALTER) 12 June 1990 (1990-06-12) * column 7, line 43 - line 53 *	1	A23G1/00 A23G1/20 A23G3/20
X	GB 549 427 A (H.W.K. PEARNS ET AL.) 20 November 1942 (1942-11-20) * the whole document *	1	
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D, X	US 4 834 635 A (J.W. GROEN) 30 May 1989 (1989-05-30) * column 1, line 54 - line 56; figures * * column 5, line 62 - column 6, line 11 *	1, 2	
A	GB 183 337 A (H. G. CRUIKSHANK) 27 July 1922 (1922-07-27) * the whole document *		
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Place of search <b>THE HAGUE</b>		Date of completion of the search <b>13 July 1999</b>	Examiner <b>Guyon, R</b>
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date L : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 (3-92) (P/C/D)



**ANNEX TO THE EUROPEAN SEARCH REPORT  
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

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